# Operating Instructions

**External radio unit for plics® sensors**

## PLICSMOBILE T61

External GSM/GPRS radio unit

Document ID: 37700

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**Information:**
Supplementary documents appropriate to the ordered version come with the delivery. You can find them listed in chapter "*Product description*".

Editing status: 2013-02-07

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# 1 About this document

## 1.1 Function

This operating instructions manual provides all the information you need for mounting, connection and setup as well as important instructions for maintenance and fault rectification. Please read this information before putting the instrument into operation and keep this manual accessible in the immediate vicinity of the device.

## 1.2 Target group

This operating instructions manual is directed to trained specialist personnel. The contents of this manual should be made available to these personnel and put into practice by them.

## 1.3 Symbolism used

**Information, tip, note**
This symbol indicates helpful additional information.

**Caution:** If this warning is ignored, faults or malfunctions can result.

**Warning:** If this warning is ignored, injury to persons and/or serious damage to the instrument can result.

**Danger:** If this warning is ignored, serious injury to persons and/or destruction of the instrument can result.

**Ex applications**
This symbol indicates special instructions for Ex applications.

- **List**
  The dot set in front indicates a list with no implied sequence.

→ **Action**
This arrow indicates a single action.

1 **Sequence**
Numbers set in front indicate successive steps in a procedure.

**Battery disposal**
This symbol indicates special information about the disposal of batteries and accumulators.

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# 2 For your safety

## 2.1 Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorised by the plant operator.

During work on and with the device the required personal protective equipment must always be worn.

## 2.2 Appropriate use

The PLICSMOBILE T61 is an external GSM/GPRS radio unit for transmission of measured values and for remote parameter adjustment of plics® sensors.

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by the manufacturer. Arbitrary conversions or modifications are explicitly forbidden.

## 2.3 Warning about incorrect use

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, e.g. vessel overfill or damage to system components through incorrect mounting or adjustment.

## 2.4 General safety instructions

This is a high-tech instrument requiring the strict observance of standard regulations and guidelines. The user must take note of the safety instructions in this operating instructions manual, the country-specific installation standards as well as all prevailing safety regulations and accident prevention rules.

The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for trouble-free operation of the instrument.

During the entire duration of use, the user is obliged to determine the compliance of the necessary occupational safety measures with the current valid rules and regulations and also take note of new regulations.

## 2.5 Safety label on the instrument

The safety approval markings and safety tips on the device must be observed.

## 2.6 CE conformity

The device fulfills the legal requirements of the applicable EC guidelines. By affixing the CE marking, we confirm successful testing of the product.

You can find the conformity certificate in the download section of our homepage.

**Electromagnetic compatibility**
The instrument is designed for use in an industrial environment. Nevertheless, electromagnetic interference from electrical conductors and radiated emissions must be taken into account, as is usual with a class A instrument according to EN 61326-1. If the instrument is used in a different environment, its electromagnetic compatibility with other devices must be ensured by suitable measures.

## 2.7 Environmental instructions

Protection of the environment is one of our most important duties. That is why we have introduced an environment management system with the goal of continuously improving company environmental protection. The environment management system is certified according to DIN EN ISO 14001.

Please help us fulfill this obligation by observing the environmental instructions in this manual:

- Chapter "*Packaging, transport and storage*"
- Chapter "*Disposal*"

# 3 Product description

## 3.1 Configuration

**Scope of delivery**

The scope of delivery encompasses:

- PLICSMOBILE T61
- Antenna (internal or external)
- Sensor connection cable
- Mini-USB cable
- Cable gland/blind plug (enclosed unassembled)
- Battery/accumulator pack (optional)
- Solar module (optional)
- Documentation
  - this operating instructions manual
  - if necessary, further certificates

**Constituent parts**

The PLICSMOBILE T61 consists of the components:

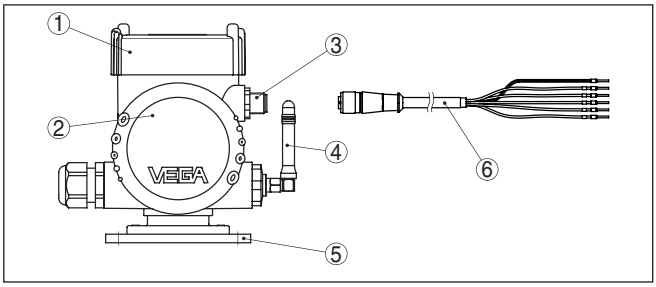


*Fig. 1: PLICSMOBILE T61*

*1 Battery chamber*
*2 Electronics chamber*
*3 Plug connection for connection of the sensor*
*4 External antenna (optional)*
*5 Mounting plate*
*6 Sensor connection cable*

**Type plate**

The nameplate contains the most important data for identification and use of the instrument:

- Article number
- Serial number
- Technical data
- Article numbers, documentation

The order data and the documentation of the instrument can be retrieved by means of the instrument serial number on the type label. To do this, go to www.vega.com, "*VEGA Tools*" and "*serial number search*".

## 3.2 Principle of operation

**Application area**

The PLICSMOBILE T61 is a GSM/GPRS radio unit for transmission of measured values and for remote parameter adjustment of plics®

sensors. Due to the large operating voltage range and the integrated power saving functions, a mains-independent power supply via battery or solar cells is possible. Typical applications are measured value transmission from mobile vessels, battery-operated level measurement and deep well measurement.

The measured value and message transmission can be optionally carried out via e-mail or SMS. Furthermore the measured values can be transitted via http to the visualisation software WEB-VV. The use of the PLICSMOBILE T61 is particularly suitable for inventory management, VMI (Vendor Managed Inventory) and remote enquiry.

**Functional principle**

The external radio unit PLICSMOBILE T61 can be connected to any 4 … 20 mA HART two-wire sensor of the plics® series. The prerequisite for this is always the version in the single chamber housing with $I^2C$ interface for connection of a VEGADIS 61. The measured value detected by the sensor is passed on via the $I^2C$ interface to the PLICSMOBILE T61.

The transmission of measured values, event messages and diagnostic information to the user is carried out via the GSM/GPRS network. Thanks to quadband technology, the device can be used virtually anywhere in the world. There is also the option of accessing the connected sensor via remote parameter adjustment.

**Voltage supply**

Power is supplied via a standard low voltage source (external power supply unit/battery/accumulator/solar module) or via an battery/accumulator pack integrated in the battery chamber (optional). You can find detailed specifications on the power supply in chapter "*Technical data*".

As an option, the PLICSMOBILE T61 can also provide power to the connected sensor.

## 3.3 Operation

The adjustment is made via PACTware and the respective DTM by using the integrated USB connection.

## 3.4 Packaging, transport and storage

**Packaging**

Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test following ISO 4180.

The packaging of standard instruments consists of environment-friendly, recyclable cardboard. For special versions, PE foam or PE foil is also used. Dispose of the packaging material via specialised recycling companies.

**Transport**

Transport must be carried out under consideration of the notes on the transport packaging. Nonobservance of these instructions can cause damage to the device.

**Transport inspection**

The delivery must be checked for completeness and possible transit damage immediately at receipt. Ascertained transit damage or concealed defects must be appropriately dealt with.

**Storage**

Up to the time of installation, the packages must be left closed and stored according to the orientation and storage markings on the outside.

Unless otherwise indicated, the packages must be stored only under the following conditions:

- Not in the open
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration

**Storage and transport temperature**

- Storage and transport temperature see chapter "*Supplement - Technical data - Ambient conditions*"
- Relative humidity 20 … 85 %

# 4 Mounting

## 4.1 General instructions

**Mounting possibilities**

In the standard version, the PLICSMOBILE T61 is designed for wall mounting. Mounting adapters for carrier rail mounting (top hat rail 35 x 7.5 according to DIN EN 50022/60715) as well as for tube mounting are optionally available.

**Installation position**

Check before mounting if there is sufficient coverage (signal strength) by the chosen mobile phone provider at the planned location. This can be simply tested with a mobile phone. Make sure the SIM cards in the PLICSMOBILE T61 and in the mobile phone are from the same mobile phone provider. If the radio reception is too weak, you should search for a better position. In closed rooms this would be, for example, close to a window or at least closer to an outer wall. As an option, an external antenna with complete confectioned cable is available.

Select a mounting location where the instrument is within easy reach for mounting and connecting as well as for the connection via USB. To facilitate mounting, the housing can be rotated by 330° without the use of any tools.

**Note:**
During operation, a distance of at least 20 cm should be kept between the antenna and persons working nearby. Operation of the instrument with smaller distances is not recommended.

**Moisture**

Use the recommended cables (see chapter "*Connecting to power supply*") and tighten the cable gland.

You can give your instrument additional protection against moisture penetration by leading the connection cable downward in front of the cable entry. Rain and condensation water can thus drain off. This applies mainly to outdoor mounting as well as installation in areas where high humidity is expected (e.g. through cleaning processes) or on cooled or heated vessels.

## 4.2 Mounting steps

**Wall mounting**

The PLICSMOBILE T61 for wall mounting is supplied with a mounting base for screw mounting.

→ Fasten the instrument with four appropriate screws (not included in the delivery) according to the following illustration.

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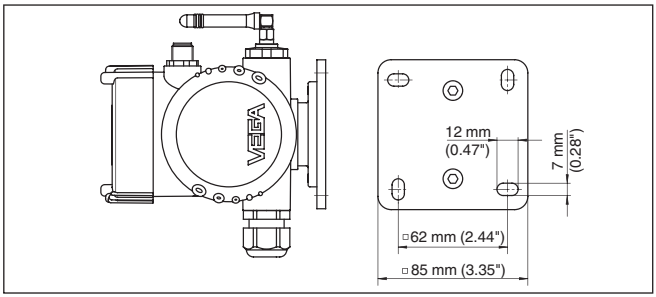


*Fig. 2: PLICSMOBILE T61 for wall mounting, bottom view of mounting plate.*

**Carrier rail mounting**

The PLICSMOBILE T61 for top hat rail mounting is supplied with an already assembled adapter for fastening on a 35 x 7.5 carrier rail.

→ Snap the instrument without tools onto the top hat rail. Loosening from the top hat rail is also carried out without tools. Through the integrated spring, you just have to apply slight lateral pressure to the instrument.

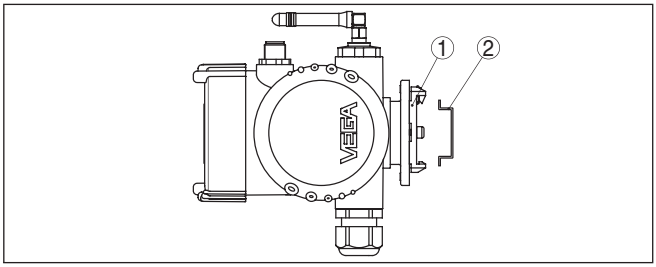


*Fig. 3: PLICSMOBILE T61 for carrier rail mounting*

*1 Adapter plate*
*2 Carrier rail*

**Tube mounting**

The PLICSMOBILE T61 for tube mounting is supplied with a measuring instrument holder and four hexagon socket screws M5 x 12 as unassembled mounting accessory.

→ Mount the measuring instrument holder according to the following illustration to the socket of PLICSMOBILE T61. Then you can fasten the instrument with the bent strap to your tube.

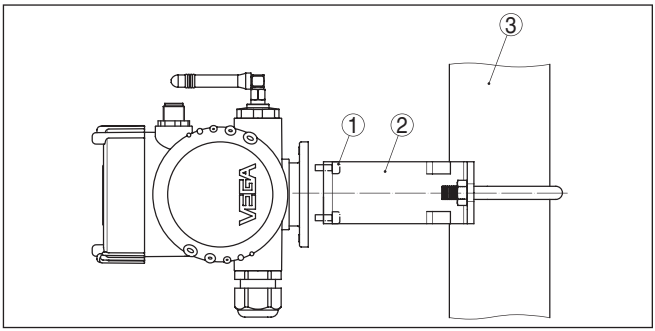


*Fig. 4: PLICSMOBILE T61 for tube mounting*

*1 4 screws M5 x 12*
*2 Measuring instrument holder*
*3 Tube*

# 5 Connecting to power supply

## 5.1 Preparing the connection

**Note safety instructions**

Always keep in mind the following safety instructions:

- Connect only in the complete absence of line voltage
- If overvoltage surges are expected, overvoltage arresters should be installed

**Select connection cable**

The operating voltage of PLICSMOBILE T61 is connected with standard cable according to the national installation standards.

The sensor connection cable included in the delivery is used to connect the sensor.

**Cable screening and grounding**

Connect the cable screen on the sensor side to ground potential. In the sensor, the screen must be connected directly to the internal ground terminal. The ground terminal on the outside of the sensor housing must be connected to the potential equalisation (low impedance).

**Note:**
Remember that only 4 … 20 mA HART two-wire sensors from the plics® series with single chamber housing can be connected. The connection is carried out via the $I^2C$ interface. Hence no additional external indication, such as e.g. VEGADIS 61, can be connected when using PLICSMOBILE.

## 5.2 Connection options

Power can be supplied to the sensor and PLICSMOBILE in two ways:

**Common voltage supply for sensor and PLICSMOBILE**

With this version, only one voltage supply is required for both devices. The voltage supply is connected to the PLICSMOBILE T61. In addition to the measured value, the sensor connection cable also carries the voltage supply of the sensor. Hence there is no 4 … 20 mA signal from the sensor electronics available for processing, e.g. via a PLC. That's why the measured value transmission can only be carried out exclusively via radio transmission through e-mail/SMS/WEB-VV.

**Separate voltage supply for sensor and PLICSMOBILE**

With this version, the sensor and the PLICSMOBILE T61 are each powered via a separate voltage supply. The measured values can be transmitted via radio communication and the 4 … 20 mA signal for processing, for example via a PLC, is available in parallel. If this version is used, the two cores (no. 1/2) of the sensor connection cable used for voltage supply are not required and must be isolated. Two cable entries are now required on the sensor (1 x sensor connection cable and 1 x external voltage supply). For this purpose, the blind stopper on the sensor must be replaced by the attached cable gland. Connection of the sensor supply is carried out according to the respective operating instructions.

## 5.3 Connection steps sensor connection cable

The sensor connection cable is used for transmission of the measured value from the sensor to the PLICSMOBILE T61. In addition, it can also transmit the voltage supply for the connected sensor.

The sensor connection cable has a length of 25 m and can be shortened individually. On one side there is a completely confectioned plug for connection to PLICSMOBILE T61. On the other side there are free cable ends for connection to the sensor.

For connection proceed as follows:

1. Connect the wire ends as described in the operating instructions manual of the sensor. Connect the numbered cables to the respectively numbered sensor terminals
2. If the sensor is supplied externally, insulate the unused cable ends
3. Connect the screen to the internal ground terminal, connect the outer ground terminal on the housing to potential equalisation
4. Tighten the compression nut of the cable entry. The seal ring must completely encircle the cable
5. Insert the plug of the sensor connection cable into the plug connection on PLICSMOBILE T61
6. Tighten plug connection

## 5.4 Connection steps voltage supply

**Connection technology**

The connection of the voltage supply is carried out via spring-loaded terminals in the housing.

**Connection procedure**

Proceed as follows:

1. Unscrew the housing cover
2. Loosen compression nut of the cable entry
3. Remove approx. 10 cm (4 in) of the cable mantle, strip approx. 1 cm (0.4 in) of insulation from the ends of the individual wires
4. Insert the cable into the cable gland through the cable entry

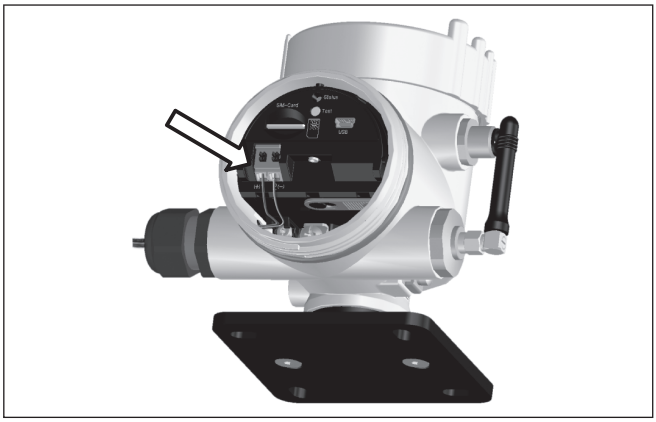

*Fig. 5: Connection steps 4 and 5*

5. Insert the wire ends into the terminals according to the wiring plan

**Information:**
Solid cores as well as flexible cores with cable end sleeves are inserted directly into the terminal openings. In case of flexible cores without end sleeves, press the terminal head with a small screwdriver; the terminal opening is freed. When the screwdriver is released, the terminal closes again.

6. Check the hold of the wires in the terminals by lightly pulling on them
7. Connect the screen to the internal ground terminal, connect the outer ground terminal to potential equalisation
8. Tighten the compression nut of the cable entry. The seal ring must completely encircle the cable
9. Screw the housing cover back on

The electrical connection is hence finished.

**Information:**
The terminal block is pluggable and can be removed from the electronics. To do this, lift the terminal block with a small screwdriver and pull it out. When inserting the terminal block again, you should hear it snap in.

## 5.5 Wiring plan

**Wiring plan with voltage supply of the sensor via PLICSMOBILE**

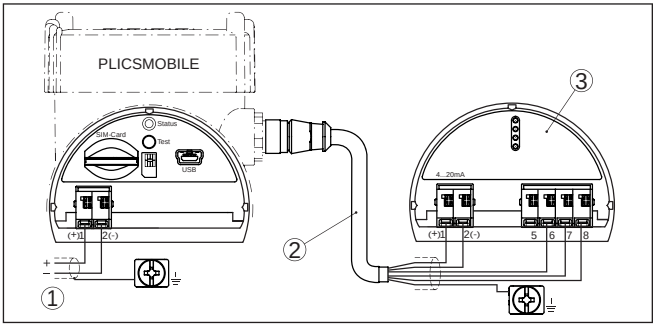


*Fig. 6: Connection of the voltage supply in the electronics housing*

1 *Voltage supply*
2 *Sensor connection cable with voltage supply*
3 *Sensor from the plics® series (only double chamber housing with I²C interface)*

**Wiring plan with external voltage supply of the sensor**

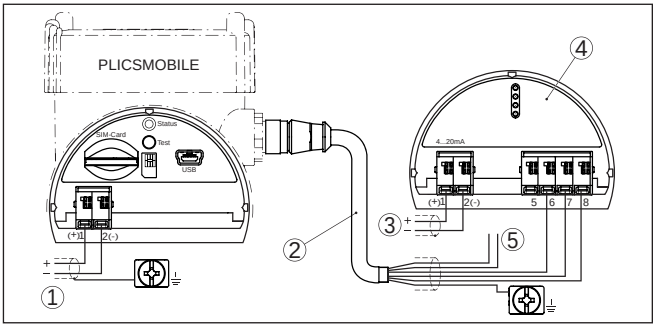


*Fig. 7: Connection of the voltage supply in the electronics housing*

1 *Voltage supply*
2 *Sensor connection cable without voltage supply*
3 *Separate voltage supply for the sensor*
4 *Sensor from the plics® series (only double chamber housing with I²C interface)*
5 *Free cores to be isolated*

**Note:**
If the sensor is powered via an external voltage supply, the two free cores (no. 1/2) of the sensor connection cable must be insulated.

# 6 Battery operation and power saving mode

## 6.1 Battery/accumulator operation

If no mains voltage is available, PLICSMOBILE can be also powered with batteries. For this purpose, a Lithium power pack (not chargeable) as well as an NiMH accumulator pack are available which can be integrated in the second housing chamber (battery chamber). As an alternative, an external battery/acumulator can be connected via the voltage supply terminals. You can find detailed information on the voltage supply in chapter "*Technical data*".

**Note:**
If there is no external voltage supply connected, the cable gland must be replaced by the blind plug included with the delivery.

The power saving mode should be switched on in battery operation and time-controlled measured value transmission and the sensor should be set to HART multidrop mode to increase the running time (details se chapter "*Power saving options*").

## 6.2 Lithium power pack

The power pack was especially developed for the seamless integration into the second housing chamber and is available from VEGA under the article code "*PM-BATT.*". This power pack particularly adapted to the PLICSMOBILE has the advantage of the max. possible capacitance with smallest dimensions and lowest weight.

The battery pack can be installed, retrofitted or exchanged without any tools. It is just inserted into the battery chamber and connected to PLICSMOBILE via the integrated plug connector.

There is a slide switch on the upper side that is switched off on delivery and must be switched on before setup. The power pack consists of Lithium primary cells and is hence not rechargeable.

**Note:**
There is a safety instruction leaflet attached to each battery pack which must be read before setup and observed.

**Insert the Lithium battery pack**

1. Open the cover of the free upper housing chamber and pull the red plug connection out of the housing. The two other plug connections (blue/black) must be directly in contact with the flat inside of the housing, below the internal cable leadthrough.
2. Shift the battery pack into the opened housing chamber of the PLICSMOBILE T61. Make sure that the plug connections (blue/black) are not shifted below the battery pack.
3. Put the two red plug connectors together.
4. Switch the instrument on for setup via the On/Off switch.

**Information:**
For logistic reasons, the Lithium power pack is always shipped separately. Hence it can happen that the PLICSMOBILE and the power pack do not arrive at the same time.

The service life of the battery depends on many factors such as e.g. the number of messages transmitted, sensor type, network quality and temperature, so no exact time can be specified. With activated power-saving mode with multidrop operation and 1 x measured value transmission per day, a service life of approx. four years can be expected.

**Note:**
If the Lithium power pack and the external voltage supply are used at the same time, the power supply with the higher operating voltage is tapped. When used together with the power pack, the external voltage supply must have an operating voltage >18 V to be able to supply power.

## 6.3 Accumulator pack

The accumulator pack was especially developed for the seamless integration into the second housing chamber and is available from VEGA under the article name "*PM-AKKUAA*". It consists of a holder with six standard cell of the size AA (Mignon), six NiMH accumulators and a regulator as well as a foam rubber sleeve for fastening in the housing chamber.

Via the integrated charging electronics, the accumulators can be charged via a power supply unit or a solar module (specifications see "*Technical data*" in the supplement). The connection is carried out on the terminals of PLICSMOBILE.

There are two slide switches and one LED indication on the upper side of the accumulator pack.

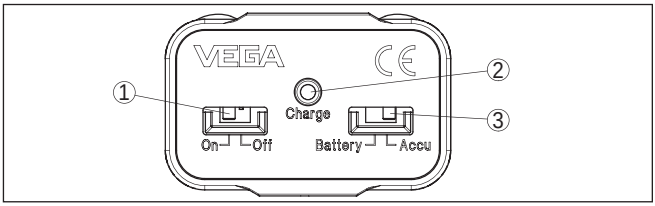


*Fig. 8: Display and adjustment elements PLICSMOBILE accumulator pack*

*1* **On/Off switch:** *Switch PLICSMOBILE on/off*
*2* **LED display Charge:** *lights yellow when the accumulator is charged*
*3* **Battery/Accu switch:** *Switch regulaor on/off*

**On/Off switch**

- **Switch position On:** PLICSMOBILE is powered, accumulators are charged with external voltage supply (power supply unit/solar module) and activated battery switch
- **Switch position OFF:** PLICSMOBILE is **not** powered, accumulators are charged with external voltage supply (power supply unit/solar module) and activated battery switch

**Battery/Accu switch**

Generally, accumulators are inserted in the battery holder. If, as an exception, non-chargeable batteries are to be used, the integrated charge regulator must be switched off.

- **Switch position Battery:** Charge regulator switched off, inserted batteries/accumulators will not be charged
- **Switch position Accu:** Charge regulator switched on, inserted accumulators will be charged

**Note:**
If the battery switch is in position **Accu**, only rechargeable accumulators may be inserted into the holder. When using batteries (non-rechargeable primary cells) and this switch position, the batteries and the instrument can be damaged. Because the batteries can heat up considerably, there is danger of battery leak or fire.

**LED display Charge**

The LED lights yellow as long as the accumulator is being charged, the LED is dark when the accumulator is full. Requirement: Charge regulator is activated and external supply voltage connected.

**Information:**
There is also deep discharge protection in the electronics integrated in the accumulator pack. In case of voltage loss or longer sunless periods (when a solar module is used) the accumulators will not be completely discharged or damaged.

**Insert accumulator pack**

The accumulator pack can be installed, retrofitted or exchanged without any tools. It is just inserted into the battery chamber and connected to PLICSMOBILE via the integrated plug connector.

1. Open the cover of the free upper housing chamber and pull the red plug connection out of the housing. The two other plug connections (blue/black) must be directly in contact with the flat inside of the housing, below the internal cable leadthrough.
2. First of all push the foam rubber sleeve into the opened housing chamber of PLICSMOBILE T61. Make sure that the plug connections (blue/black) are not pushed below the foam rubber sleeve.
3. Shift the accumulator holder equipped with six AA cells into the foam rubber sleeve and put the two red plug connectors together.
4. Switch the instrument on for setup via the On/Off switch.

## 6.4 Solar module

The PLICSMOBILE can be powered via a solar module, the accumulator pack will also be charged. Two solar modules with different size/efficiency are available: in sunny environment and max. one measured value transmission per day, the small 5 W module is sufficient, with temporary shadowing and/or more than one measured value transmission, the larger 20 W module should be used. The technical data of both modules and the order information can be found in the supplement of this instruction manual.

**Mounting**

Orient the solar module in such a way that in sunless seasons its position is ideal to the sun and maximum efficiency is achieved. Because in these seasons, the sun is very low, a steep installation angle (approx. 60 - 75 degrees) is recommended so that the sunrays reach the module at right angles. A tube holder suitable for the module is

available in the scope of delivery. The adjustment range of the inclination is 38 to 75 degrees, the orientation of the direction is individually possible due to the tube mounted. As an option also a holder for mounting on vertical surfaces such as walls is available.

**Note:**
The tube holder of the solar module is suitable for tube diameters of 30 … 60 mm (1.2 … 1.4 in). If the PLCSMOBILE should be mounted to the same tube, a tube with ø 60 mm is required.

Fasten the PLICSMOBILE close to the solar module to avoid unnecessary voltage loss on the cable.

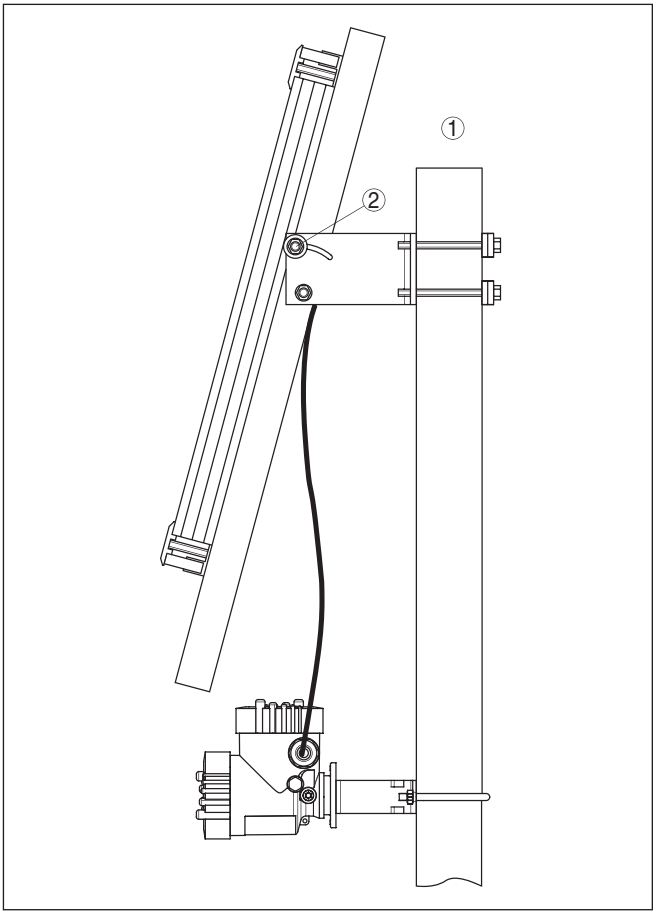


*Fig. 9: Tube mounting PLICSMOBILE with solar module*

*1 Tube/mast with ø 60 mm (1.4 in)*
*2 Adjusting screw, inclination angle*

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**Connection**

The solar module comes ready to use with a 5 m connection cable. The free cable end is led through the screw connection into the electronics chamber of the PLICSMOBILE. You can find the details on connection in chapter "*Connecting to power supply*". The black core is connected to terminal 1(+), the brown core to terminal 2(-).

**Note:**
Make sure that the two cores of the connection cable are energized when the solar module is not covered. Avoid a shortcircuit during mounting and conenction. This should also be avoided when shortening the cable, if necessary.

## 6.5 Battery sizing

When selecting an external battery/accumulator, the following points must be observed:

**Power consumption in power saving mode:**
If a battery or an accumulator is used which cannot be automatically charged cyclically, then the power saving mode should be activated. With an operating voltage of e.g. 12 V, a standby power consumption of 0.3 mW must be taken into account. With an assumed lifetime of e.g. one year, the requirement is approximately 2.6 Wh, which corresponds to a battery capacity of 0.22 Ah at 12 V. The standby power consumption with specific operating voltages is stated in the "*Technical data*".

**Power requirement complete measurement cycle incl. measured value transmission:**
A measurement cycle lasts approximately 60 to 120 seconds (dependent on sensor type and network quality) and includes automatic switching on of the sensor (HART multidrop mode with 4 mA), recording of the measured value, measured value transmission and a return to the power saving mode. During this time, approximately 20 mWh of energy is required. For example, with one measurement per day, this adds up to approx. 9.6 Wh per year, which corresponds to a battery capacity of approx. 0.8 Ah at 12 V.

**Examples for battery capacity depending on the number of transmission cycles**

| Number of messages/day | Annual consumption PLICSMOBILE | | |
|---|---|---|---|
| | Standby energy demand | Energy demand for message transmission | Required battery capacitance with 12 V |
| 1 | 2.6 Wh | 9.6 Wh | 0.8 Ah |
| 2 | 2.6 Wh | 16.8 Wh | 1.4 Ah |
| 4 | 2.6 Wh | 32.4 Wh | 2.7 Ah |
| 8 | 2.6 Wh | 61 Wh | 5.1 Ah |
| 24 | 2.6 Wh | 178.8 Wh | 14.9 Ah |

**Note:**
Due to the nature of the system, each battery and accumulator has a self-discharge which can vary considerably dependent on the type. This is very important for the calculation of the required capacitance. In the listed examples, this self-discharge is not taken into accunt. The available capacitance depends also considerably from the temperature. The specifications refer to a temperature of 20 °C (68 °F).

## 6.6 Power saving options

In the DTM (see chapter "*Parameter adjustment with PACTware*") you can select under the menu item "***Energy options***" between the modes "***Continuous operation***" and "***Power saving mode***".

**Permanent operation**

In permanent (non-stop) operation PLICSMOBILE and the sensor always remain switched on. Only in this mode can the instrument be used for level monitoring and send an e-mail when a certain level is reached or an error occurs (measured value/status-controlled transmission). In permanent operation PLICSMOBILE allows remote parameter adjustment. Configuration changes on PLICSMOBILE as well as the sensor can thus be carried out remotely from any PC with PACTware.

**Power saving mode**

In this mode, the integrated GSM modem as well as the sensor connected to PLICSMOBILE are switched on automatically if a time-controlled message transmission is pending. After the correct measured value is recorded, the login into the GSM network is carried out and the measured value sent. The system then returns to power saving mode. The time for this transaction depends on the connected sensor type and the network quality and is normally 60 to 120 seconds. A pressure transmitter, for example, receives the measured value much faster than a radar or ultrasonic sensor.

**Note:**
Please note that event-controlled transmission (measured value/ status-controlled) is not possible in the power saving mode. A dial-in connection for remote parameter adjustment is also not possible during the inactive time.

**HART multidrop**

With battery operation and a HART sensor with non-required 4 … 20 mA signal, we recommend setting the sensor to multidrop mode. In such case, the sensor consumes constantly only 4 mA independent of the measured level, which can increase battery life considerably. A description of the activation of multidrop mode can be found in the operating instructions of the indicating and adjustment module.

# 7 Setup

## 7.1 Adjustment system

**Setup requirements**

A pC with PACTware and respective DTM is required for setup. The connection is carried out via a standard mini USB cable (in the scope of delivery). A released SIM card with data transmission option must be used in PLICSMOBILE T61. A good network coverage of the used GSM/GPRS network must be available at the place of operation.

Adjustment on the instrument is limited to a test key and an LED. With these, the operation and the status of the instruments can be checked (selection of the GSM network, standby …).

**Display and adjustment elements**

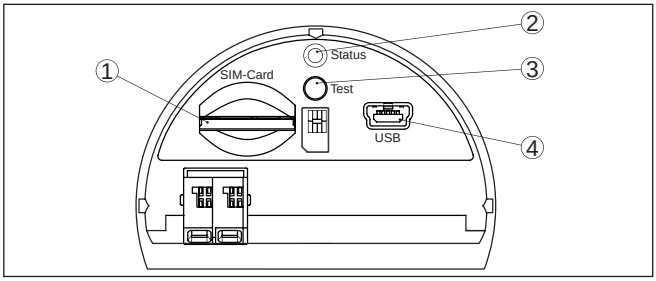


*Fig. 10: Display and adjustment elements*

*1 SIM card slot*
*2 Status indication*
*3 Key to the test operation*
*4 Mini-USB interface*

**Information:**
The function description of the key and the status indication is available in chapter "*Mobile phone network and SIM card*".

## 7.2 Connect the PC

**Connection of the PC via USB**

The parameter adjustment of PLICSMOBILE T61 is carried out via PC and USB interface. The required connection is located in the electronics housing. Keep in mind that proper functioning of the USB interface can only be guaranteed in the (limited) temperature range of 0 … +60 °C.

If the PC is provided with a Full-Power-USB-Port, the PLICSMOBILE is powered via the integrated USB power supply. Parameter adjustment is thus possible without connected power supply, but measured value recording and transmission is not possible. Power supply via USB is not possible with a Low-Power-USB-Port.

**Note:**
The connection via USB requires a driver. First install the driver before connecting PLICSMOBILE T61 to the PC.

The required USB driver is included on the CD "*DTM Collection*". You should always use the latest version to ensure support of all instru-

ment functions. The system requirements for operation correspond to those of the "*DTM Collection*" or of PACTware.

During installation of the "*DTM Collection*", the appropriate instrument driver is installed automatically. When PLICSMOBILE T61 is connected, the driver installation is completed autonomously and is ready for operation without a restart.

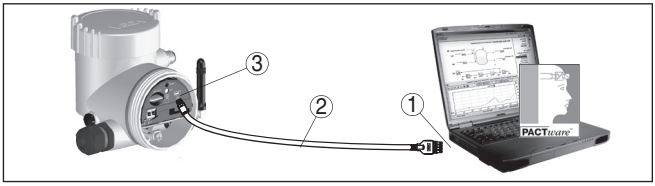


*Fig. 11: Connection of the PC via USB*

*1 USB interface of the PC*
*2 Mini-USB connection cable (in the scope of delivery)*
*3 USB interface of PLICSMOBILE T61*

## 7.3 Parameter adjustment with PACTware

**Prerequisites**

For adjustment via PC, the configuration software PACTware and a suitable instrument driver (DTM) according to FDT standard are required. The up-to-date PACTware version as well as all available DTMs are compiled in a DTM Collection. The DTMs can also be integrated in other frame applications according to FDT standard.

**Note:**
To ensure that all instrument functions are supported, you should always use the latest DTM Collection. Furthermore, not all described functions are included in older firmware versions. You can download the latest instrument software from our homepage. A description of the update procedure is also available in the Internet.

The basic operation of the software is described in the operating instructions manual "*DTM Collection/PACTware*" attached to each DTM Collection and which can also be downloaded from the Internet. Detailed descriptions are available in the online help of PACTware and the DTMs.

**Standard/Full version**

All device DTMs are available as a free-of-charge standard version and as a full version that must be purchased. In the standard version, all functions for complete setup are already included. An assistant for simple project configuration simplifies the adjustment considerably. Saving/printing the project as well as import/export functions are also part of the standard version.

In the full version there is also an extended print function for complete project documentation as well as a save function for measured value and echo curves. In addition, there is a tank calculation program as well as a multiviewer for display and analysis of the saved measured value and echo curves.

## 7.4 Mobile network and SIM card

An activated SIM card with data transmission option is required for setup.

**Information:**
The SIM card does not belong to the scope of delivery of the instrument and must be provided by the respective operator. To avoid roaming costs, the card should be bought in the country in which the PLICSMOBILE T61 is installed and operated.

**Dial-In (remote parameter adjustment)**

Dial-in connections on PLICSMOBILE are only possible if the SIM card used supports the data service CSD (Circuit Switched Data). Dial-in connections are used for remote parameter adjustment. The use of GPRS is not possible.

**Note:**
When the power saving mode is activated in PLICSMOBILE, it cannot be contacted by a dial-in connection during the inactive time. During the active time (during a data transmission), incoming dial-in connections are accepted and maintained independent of the power saving mode until the dial-in connection is terminated.

**Dial-Out (measured value transmission)**

Data connections (Dial-Out) from PLICSMOBILE can be optionally established via GPRS (volume-based billing) or a dial-up connection (CSD, time-based billing). The transmission mode can be selected when setting up via PACTware and DTM. Outgoing connections are used for measured value transmission via E-mail/SMS/WEB-VV.

The data transmission can be either carried out via CSD but also via GPRS. The availability of GPRS at the location of PLICSMOBILE depends on the respective mobile network provider. With CSD, the transmission costs are calculated by means of the required time. With GPRS, the calculation is made according to the transmitted data volume. For this, the data transmission should be always carried out via GPRS, if possible.

When transmitting the measured value via e-mail or WEB-VV, approximately 5 KB data are transmitted. For example with an hourly transmission this will cause a monthly net data volume of totally approximately 4 MB.

Dependent on the selected tariff, the mobile network provider carries out a so called block rounding. When checking out of the GPRS network billing units are rounded. Since the PLICSMOBILE checks out of the GPRS network after transmission of each message provided the energy saving mode is activated, this block rounding is applied with each transmission. If for example a tariff with a block rounding to 100 KB is used, then an hourly measured value transmission causes a monthly billing volume of more than 70 MB. Select therefore a pure data tariff (M2M) with a possibly low block rounding.

**Insert SIM card**

Insert the card with the beveled side in front into the card slot until it snaps in. The contact surface must point downward.

**Note:**
The electronics must be voltage-free when inserting the SIM card. To ensure this, the entire voltage supply must be switched off. This includes disconnecting a battery and USB cable that might be installed. Take ESD protective measures when handling the SIM card. Electrostatic discharges can damage the SIM card or the PLICSMOBILE.

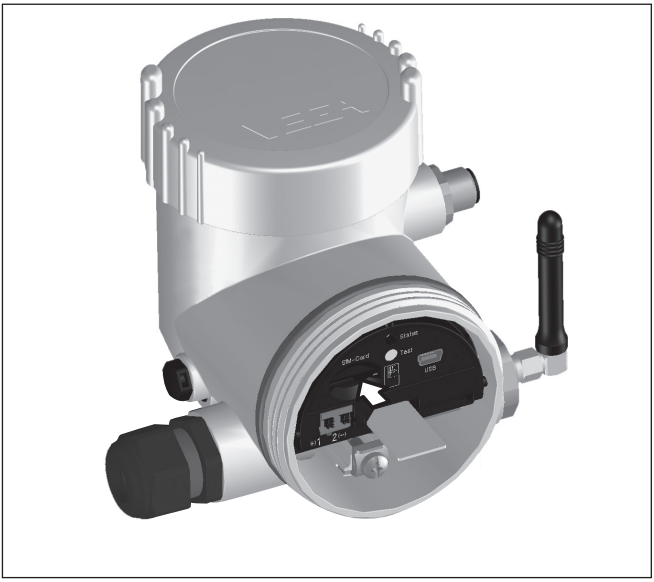


*Fig. 12: Insert SIM card*

**Activate SIM card**

To avoid misuse, the SIM card is generally locked by a PIN. To ensure that PLICSMOBILE can contact these locked SIM cards, first of all the PIN must be entered. For this purpose the assistant "*Activate SIM card*" is available in the DTM. Enter here the correct PIN for the card. The assistant also offers the option of changing the PIN.

Then check if the card is logged into the network and if sufficient network coverage (signal strength) exists. This can be checked in the DTM menu "*Network information*" under "*Setup - Diagnosis*". You can also see the general device status via the status indication.

**Status indication**

The following operating conditions are signalled via the LED status indication:

- **LED does not light:** no operating voltage or power saving mode active
- **Constant flashing:** Instrument is not logged into the GSM network
- **Unsteady flashing (long OFF/short ON):** instrument is booked into the GSM network
- **Continuous light:** Transmitting or dia-up connection (via CSD) active

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**Test key**

When PLICSMOBILE is in power saving mode, a login procedure can be triggered by briefly pushing the test key. The user can thus check via the status LED whether a login into the GSM network is possible.

## 7.5 Internet connection and measured value transmission

**Internet connection (Dial-Out)**

The transmission of measured values via e-mail or to the visualization software WEB-VV is always based on an Internet connection. Access data (user name/password) are required for this connection. With a GSM connection, a dial-in number is also required; with a GPRS connection, the APN (Access Point Name) must be given. You can get this information from your mobile phone provider. Further information and a list of common mobile phone providers with their access data can be found in the online help of the PLICSMOBILE DTM.

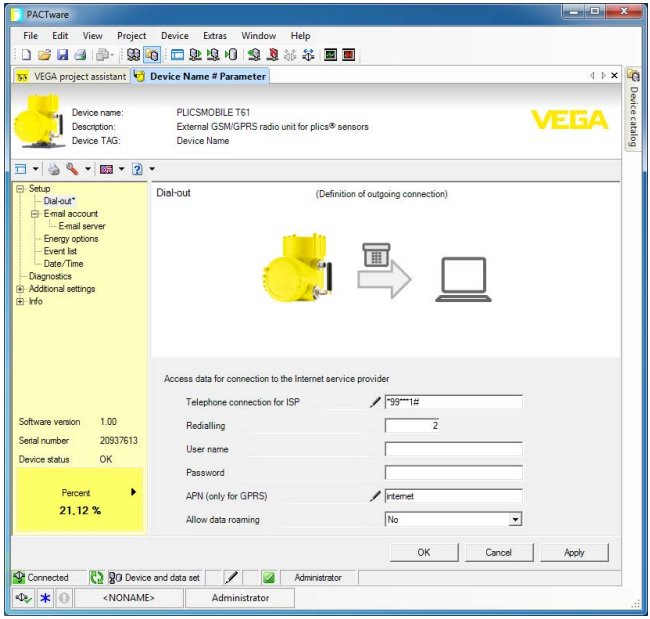


*Fig. 13: Entering the Internet access data*

**Measured value transmission**

The measured values can be transmitted optionally in the following ways:

- Via integrated mail client to any e-mail address
- Via SMS to any mobile phone
- Via http to the visualization software WEB-VV

Under the DTM menu item "*Event list*" there is a convenient assistant for setting up measured value transmission. The measured values can be transmitted at individually definable times or intervals. A message can also be triggered when a certain level is exceeded or underrun. In addition, a status-controlled measured value transmission can be carried out, for example when a fault signal occurs.

**E-mail transmission**

For this option, an e-mail account with name of the inbox and outbox server (POP3/SMTP) as well as the user name/password are required for authentication. These data are available from your e-mail provider. You can find further information in the online help of the PLICSMOBILE DTM.

The measurement data can be sent either directly in the e-mail or in an attached file. The formats TXT, CSV, HTML or XML are available.

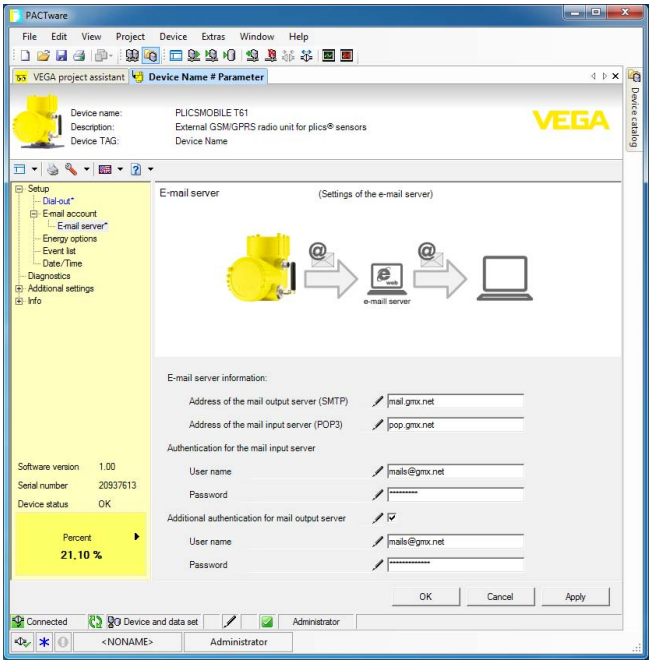


*Fig. 14: Input of the e-mail access data*

**SMS transmission**

For measured value transmission via SMS, no additional access data are required because all needed information is already available via the mobile phone contract.

**WEB-VV**

For the configuration, only the URL or the IP address of the WEB-VV server are required. When hosting is carried out through VEGA, the server is contacted via the URL: "*web-vv.vega.com*". If WEB-VV is hosted in your company, you will get the URL from your IT department.

**Remote parameter adjustment (Dial-In)**

The setup of PLICSMOBILE and sensor is carried out via USB and a PC with PACTware and corresponding DTM. With a SIM card with activated CSD service, access via the radio link is also possible (remote parameter adjustment). Keep in mind that this is carried out via a dial-in connection, which bases invoicing on connection time. Considerable connection costs can be incurred depending on the duration of use.

# 8 Maintenance and fault rectification

## 8.1 Maintenance

If the instrument is used properly, no special maintenance is required in normal operation.

## 8.2 Rectify faults

**Reaction when malfunctions occur**

The operator of the system is responsible for taking suitable measures to rectify faults.

**Failure reasons**

A maximum of reliability is ensured. Nevertheless, faults can occur during operation. These may be caused by the following, e.g.:

- Measured value from sensor not correct
- Voltage supply
- Interference on the cables

**Fault rectification**

The first measures to be taken are to check the input/output signals as well as to evaluate the error messages via the DTM. The procedure is described below. In many cases, the causes can be determined in this way and faults can be rectified.

**24 hour service hotline**

Should these measures not be successful, please call in urgent cases the VEGA service hotline under the phone no. **+49 1805 858550**.

The hotline is available to you 7 days a week round-the-clock. Since we offer this service world-wide, the support is only available in the English language. The service is free of charge, only the standard telephone costs will be charged.

**Error messages**

| Error code | Cause | Rectification |
|---|---|---|
| No indication of the signal strength | No GSM network available | – Check network availability via mobile phone |
| E008 | Sensor not found | – Check connection of the sensor |
| E013 | Sensor signals failure, no valid measured value | – Check sensor parameter adjustment<br>– Send sensor for repair |
| E030 | Sensor in boot phase<br>value not valid | – Check sensor parameter adjustment |
| E034 | EEPROM CRC error | – Switch the instrument off and on<br>– Carry out a reset<br>– Send instrument for repair |
| E035 | ROM CRC error | – Switch the instrument off and on<br>– Carry out a reset<br>– Send instrument for repair |
| E036 | Instrument software not executable (during software update or after failed update) | – Wait until software update is finished<br>– Carry out another software update |

| Error code | Cause | Rectification |
|---|---|---|
| E042 | Hardware error with selfcheck | – Send instrument for repair |
| E053 | Sensor measuring range not read correctly | – Communication error: Check sensor cable and screening |
| E086 | Error communication hardware (initialisation of the radio module failed) | – Initialisation is carried out automatically. If the error exists permanently, send instrument for repair |

**Reaction after fault rectification**

Depending on the reason for the fault and the measures taken, the steps described in chapter "*Set up*" may have to be carried out again.

## 8.3 Instrument repair

If a repair is necessary, please proceed as follows:

You can download a return form (23 KB) from our Internet homepage www.vega.com under: "*Downloads - Forms and certificates - Repair form*".

By doing this you help us carry out the repair quickly and without having to call back for needed information.

- Print and fill out one form per instrument
- Clean the instrument and pack it damage-proof
- Attach the completed form and, if need be, also a safety data sheet outside on the packaging
- Please ask the agency serving you for the address of your return shipment. You can find the respective agency on our website www.vega.com under: "*Company - VEGA worldwide*".

**Note:**
If a battery-operated VEGA instrument is returned for repair, the battery/power pack must be removed. Please send only the instrument, not the battery/power pack.

# 9 Dismounting

## 9.1 Dismounting steps

Take note of chapters "*Mounting*" and "*Connecting to power supply*" and carry out the listed steps in reverse order.

## 9.2 Disposal

The instrument consists of materials which can be recycled by specialised recycling companies. We use recyclable materials and have designed the electronics to be easily separable.

Materials: see chapter "*Technical data*"

For disposal or recycling within the European Union proceed according to the "*Electronics recycling*" and "*Battery/Accumulator recycling*" below. Outside the European Union you should take note of the valid national regulations.

**Electronics recycling**

This instrument is not subject to the WEEE directive 2002/96/EG and the respective national laws. Therefore pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points. These may be used only for privately used products according to the WEEE directive.

**Battery/accumulator recycling**

**Note:**

The disposal is subject to the directive 2006/66/EG on batteries and accumulators.

Batteries and accumulators contain some environmentally harmful but also some valuable raw materials that can be recycled. For that reason batteries and accumulators must not be disposed of in household waste.

All users are legally obligated to bring batteries to a suitable collection point, e.g. public collection points. You can also return the batteries and accumulators to us for correct disposal. Due to the very strict transport regulations for lithium-based batteries/accumulators, this is normally not a good idea because shipment is very expensive.

Correct disposal avoids negative effects on humans and the environment and ensures recycling of useful raw materials.

# 10 Supplement

## 10.1 Technical data

| General data | |
|---|---|
| 316L corresponds to 1.4404 or 1.4435, 316Ti corresponds to 1.4571 | |
| Materials | |
| – Housing | plastic PBT, Alu die-casting, 316L |
| – Ground terminal | 316Ti/316L |
| Weight | |
| – Plastic housing | 595 g (1.311 lbs); 633 g (1.396 lbs) with external antenna |
| – Aluminium housing | 1231 g (6.415 lbs) |

| Voltage supply | |
|---|---|
| Operating voltage[1] | 8 … 32 V DC |
| Power consumption[2] | |
| – Power saving mode (9 V/12 V) | 0.18 mW/0.3 mW |
| – Power saving mode (24 V/32 V) | 1.8 mW/3.7 mW |
| – Permanent operation | 1.1 W |
| – Peak power (measured value transmission) | 5.1 W |
| Power requirement[3] | |
| – Measurement cycle incl. transmission | 20 mWh |

| Battery pack (optional) | |
|---|---|
| Battery type | Lithium (not chargeable) |
| VEGA order code | PM-BATT. |
| Operating voltage | 18 V DC |
| Capacitance | approx. 3.5 Ah |

| Accumulator pack with charging electronics (optional) | |
|---|---|
| Accumulator type | 6x NiMH series AA (Mignon) |
| Manufacturer/series | Panasonic/Evolta |
| VEGA order code | PM-AKKUAA |
| Capacitance | 2050 mAh |
| Nominal voltage accumulator pack | 7.2 V DC |
| Charging voltage accumulator pack | 20… 32 V DC |
| Ambient temperature | |
| – Charging | 0 … +55 °C (32 … +131 °F) |

[1] When the instrument is powered by an external voltage supply, make sure the voltage supply unit has a sufficient current carrying capacity. With a voltage supply <9.6 V, current peaks of up to 2 A must be expected.
[2] The listed power specifications include the voltage supply of a HART sensor with 20 mA
[3] The listed energy requirement includes the voltage supply of a HART sensor (VEGAPULS 61 with 4 mA (multidrop mode) and 12 V operating voltage

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| | |
|---|---|
| – Discharging | -10… +60 °C (-14 … +140 °F) |
| **Solar module (optional)** | |
| Solar module 5 W | |
| – Nominal voltage | 17.8 V DC |
| – max. open circuit voltage | 22 V DC |
| – Nominal current | 0.285 A |
| – max. shortcircuit current | 0.315 A |
| – Dimensions | 401 x 176 x 35 mm (15.8 x 6.9 x 1.3 in) |
| Solar module 20 W | |
| – Nominal voltage | 17.8 V DC |
| – max. open circuit voltage | 22 V DC |
| – Nominal current | 1.14 A |
| – max. shortcircuit current | 1.27 A |
| – Dimensions | 662 x 299 x 35 mm (26.1 x 11.8 x 1.3 in) |
| Connection cable | |
| – Length | 5 m (196 in) |
| – Wire cross-section | 2x 0.5 $mm^2$ (AWG 20) |
| – Material, cable cover | PVC |
| **Sensor power supply** | |
| Number of sensors | 1 x plics® sensor 4 … 20 mA/HART (two-wire) |
| Terminal voltage | 20.0 … 19.3 V with 4 … 20 mA |
| Current limitation | Short-circuit proof |
| **Radio transmission** | |
| Radio frequency | Quadband GSM (850/900/1800/1900 MHz) |
| Antenna connection | SMA socket |
| Antenna version | Isotropic (Omni) antenna |
| **USB interface[4)]** | |
| Quantity | 1 x in the lateral housing chamber |
| Plug connection | Mini-B (4-pole) |
| USB specification | 2.0 (Fullspeed) |
| Max. cable length | 5 m (196 in) |
| **Electromechanical data** | |
| Cable entry/plug | |

4) Limited temperature range, see ambient conditions

| | |
|---|---|
| – Electronics housing | – 1 x cable gland M20 x 1.5 (cable ø 5 … 9 mm), 1 x SMA antenna connection (optional), 1 x plug for sensor connection<br>or:<br>– 1 x closing cap ½ NPT, 1 x SMA antenna connection (optional), 1 x plug for sensor connection |
| Spring-loaded terminals for wire cross-section | |
| – Massive wire, cord | 0.2 … 2.5 mm² (AWG 24 … 14) |
| – Stranded wire with end sleeve | 0.2 … 1.5 mm² (AWG 24 … 16) |
| Sensor connection cable | |
| – Length | 25 m |

**Ambient conditions**

| | |
|---|---|
| Ambient temperature | |
| – Instrument in general | -25 … +60 °C (-13 … +140 °F) |
| – USB interface | 0 … +60 °C (+32 … +140 °F) |
| Storage and transport temperature | -25 … +80 °C (-13 … +176 °F) |

**Electrical protective measures**

| | |
|---|---|
| Protection rating | IP 66/IP 67[5)] |

**Electrical separating measures**

| | |
|---|---|
| Reliable separation according to VDE 0106 part 1 between power supply and input | |
| – Reference voltage | 50 V |
| – Isolation resistance | 1.5 kV |

**Radio approvals**

| | |
|---|---|
| Radio approvals of the integrated GSM modem | |
| – FCC ID | RI7GE865 |
| – IC (Industry Canada) | 5131 A-GE865 |

**Approvals**

Instruments with approvals can have different technical data depending on the version.

For that reason the associated approval documents of these instruments have to be carefully noted. They are part of the delivery or can be downloaded under www.vega.com via "*VEGA Tools*" and "*serial number search*" as well as via "*Downloads*" and "*Approvals*".

[5)] A suitable cable is the prerequisite for maintaining the protection rating.

## 10.2 Dimensions

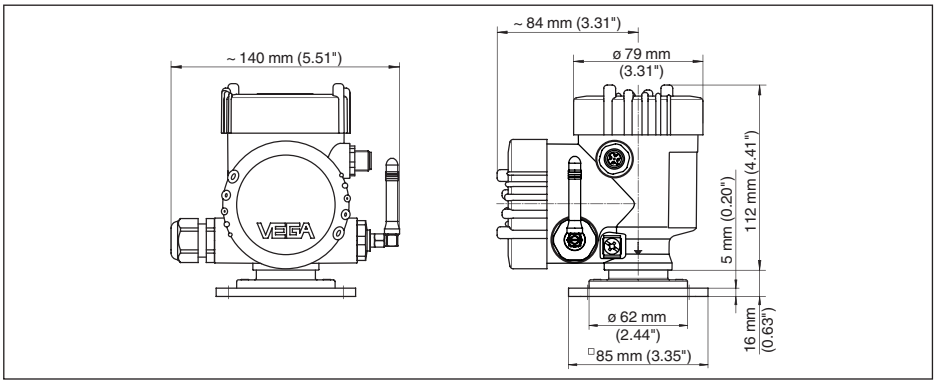


*Fig. 15: Dimensions PLICSMOBILE T61 with plastic housing*

## 10.3 Industrial property rights

Линии продукции фирмы ВЕГА защищаются по всему миру правами на интеллектуальную собственность. Дальнейшую информацию смотрите на сайте _____

VEGA系列产品在全球享有知识产权保护。

进一步信息请参见网站<_____>。

## 10.4 Trademark

All the brands as well as trade and company names used are property of their lawful proprietor/ originator.

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Printing date:

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